

# Children and the Environment: An Overview of Risks, Rates and Policy Implications

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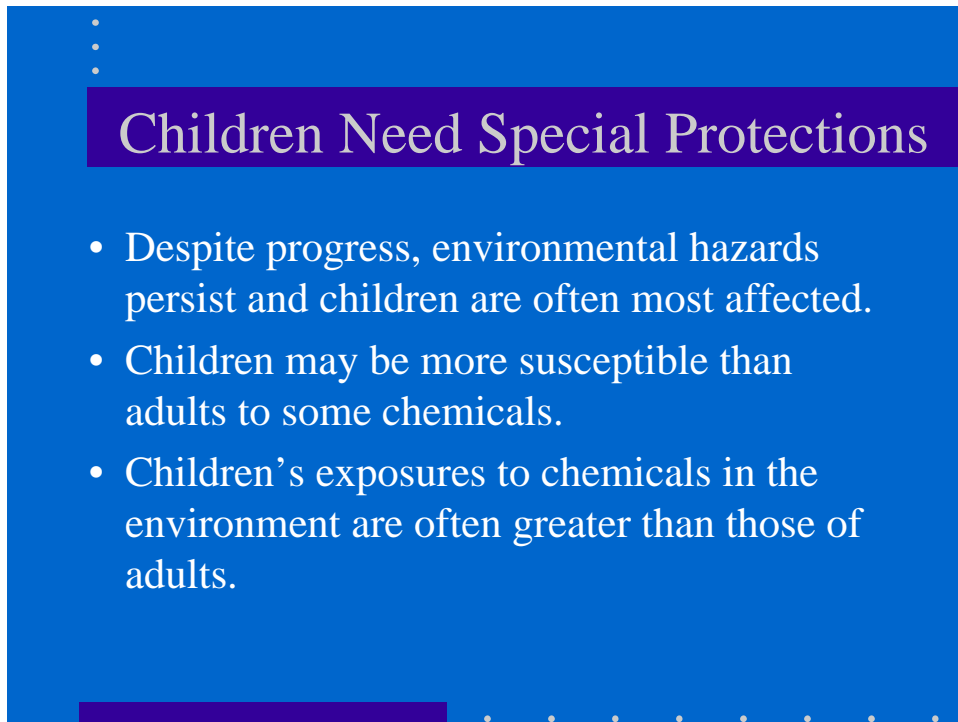
DR. GOLDMAN: I really want to thank you for the invitation to be here with you today.

As I look around the room here I remember all of the wonderful people who are with your programs here in California. I have to admit that during the time I spent in Washington, I would try to block you out of my mind because you are wonderful, and this is an incredible resource that you have here.

The state is to be congratulated on enactment of the new legislation which I think is a precedent. I think California is the first state to recognize that there needs to be special attention paid to children's health when it comes to environmental protection. As usual, California is in the forefront

I also wanted to say something about Hanafi Russell. I was very shocked this morning when I saw the announcement of his very untimely death. He was an inspiration to me in my career, not only his commitment to communicating very directly with people in terms that the public could understand, but also his great dedication to children. And on a very personal level his life was an inspiration, the time and commitment that he made in his life for children. He's a hero of mine, and it's very sad that he's no longer with us.

I'm going to go to the slides.



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## Children Need Special Protections

- Despite progress, environmental hazards persist and children are often most affected.
- Children may be more susceptible than adults to some chemicals.
- Children's exposures to chemicals in the environment are often greater than those of adults.

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I think that it is now well understood that children need additional protections when it comes to the environment. And as Dr. Marty said, they may not only be more susceptible, but also more exposed and, frankly, in the past these differences have been overlooked.



## Children are not little adults

- Exposure
- Metabolism
- Growth and Development
- Shelf Life

Children are not little adults in four basic respects. Their exposure, metabolism, growth and development, and shelf life, is different.



## Children are more exposed

- They breathe more air, drink more water and eat more food, pound for pound, than adults.
- Children play close to the ground, where some pollutants concentrate.
- Normal hand-to-mouth activity exposes kids to pollutants in dust and soil.

They are more exposed in that they can breathe more air, drink more water, and eat more food pound-per-pound; they may be closer to the ground where pollutants often concentrate; and, of course, their behavior patterns may predispose them to having more exposure than adults do. It wouldn't be normal for one of us to be rolling around on this carpet nearly naked with our hands in our mouth, yet a young infant will do that.

## Children have different metabolism

- They may be more or less capable of breaking down, excreting, inactivating, or activating toxic substances. These differences should be taken into account.

Children have a different metabolism. They may be more or less capable of breaking down, excreting, or activating toxic substances, and in the past we have not taken these differences into account (except in the case of certain pharmaceuticals).

## Children's growth and development make them vulnerable

- Organ systems – central nervous system, reproductive organs, immune system, and lungs – are more susceptible to toxic insult at various phases of development.

Their growth and development can make them very vulnerable. Our babies when born are almost uniquely helpless among mammals. Our babies have immature immune systems and immature central nervous systems. They cannot really control their arms and legs; those neural pathways are still forming. And, of course, they have very rapid phases

of growth, not only in the first few years of life but also during adolescence. This is a setup for harm.



## Children have a longer shelf life

- With more future years for disease to express itself, diseases with long latency periods or requiring chronic exposure may have more serious impacts.

What I mean by longer shelf life is the fact that there are more years for adverse effects to manifest themselves and that effects that have a longer latency period are more likely to be seen with younger age exposures.

## Children are often more susceptible

- Example is PCBs

I'm going to give an example of PCBs. I know you're going to hear a lot more about PCBs later in the day, so I'm going to really brush over this lightly.

## PCBs Low Level Prenatal Exposure Outcomes

**Newborns:** decrease in birth weight (inconsistent)

**Infants:** motor delay detectable from newborn period to 2 years

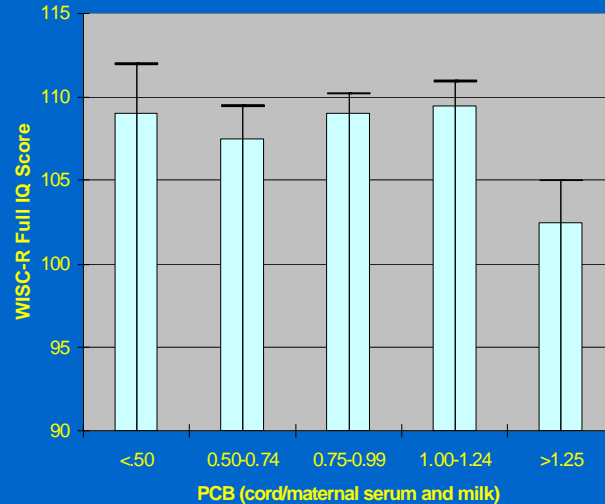
**7-month olds:** defects in visual recognition memory

**4-year olds:** defects in visual recognition memory

**11-year olds:** delays in cognitive development

This slide is actually derived from a paper that Dr. Rogan, who is here, published. With prenatal low-level exposures you can see a number of effects in terms of lower birth weight and motor delays. Delays in cognitive development have been observed now up to the age of 1.

## PCBs vs. 11 year IQ (Jacobsons)



This is a slide from one of four major longitudinal studies of PCBs and children's brain development. This is turning out to be much like the lead story, in that with low-level prenatal exposure to PCBs you see a long-term impact on I.Q. The Jacobson study and one of the other studies that has been able to go out this far both find that this effect happens at the highest exposure levels. These are levels that are within the "normal" population, these are not highly-exposed cohorts.

## Postnatal exposures to high level of PCBs and PCDFs

### Direct ingestion of high doses of PCBs and PCDFs

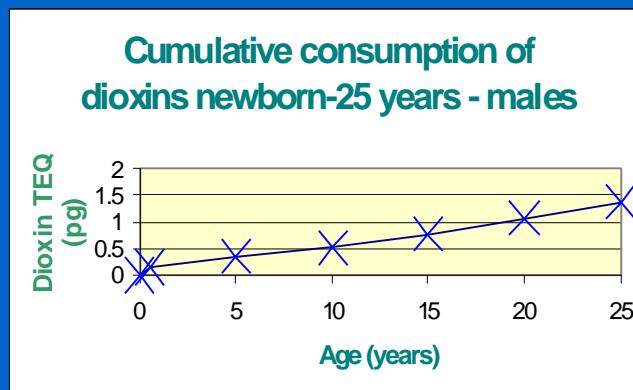
**Any age:** chloracne, keratoses, and hyperpigmentation; mixed peripheral neuropathy; and gastritis

### Dermal exposure to high levels of TCDD

**Children:** probably higher absorbed dose for a given exposure than adults; chloracne and liver function test abnormalities

PCB exposures at high levels in adults result in very different health impacts. So, like lead, you do have toxic effects on exposed adults, but only at much higher-level exposure levels and the impacts are very different than those found in children.

## Exposures to dioxins: birth to age 25

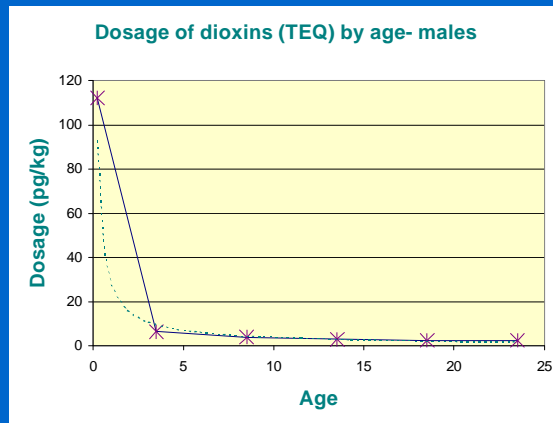


Source: Patandin et al, Environmental Health Perspectives, 107:1, 1999.

Dioxins are an example of how highest exposures can occur to the youngest children. This is from a Dutch study; a longitudinal cohort study of PCB and dioxin exposures by Patandin et al. The graph shows the cumulative exposures to dioxin over the first 25 years of life. There is a gradual steady increase in accumulation of dioxins in the body.



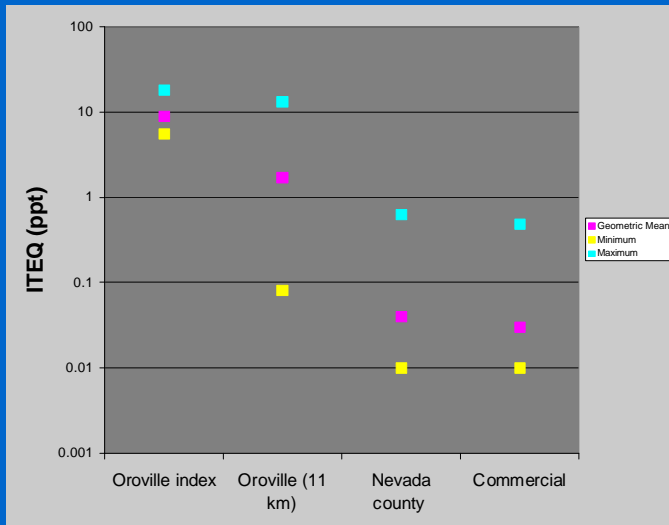
## Breast feeding infants have highest doses



Source: Patandin et al,  
Environmental Health Perspectives,  
107:1, 1999.

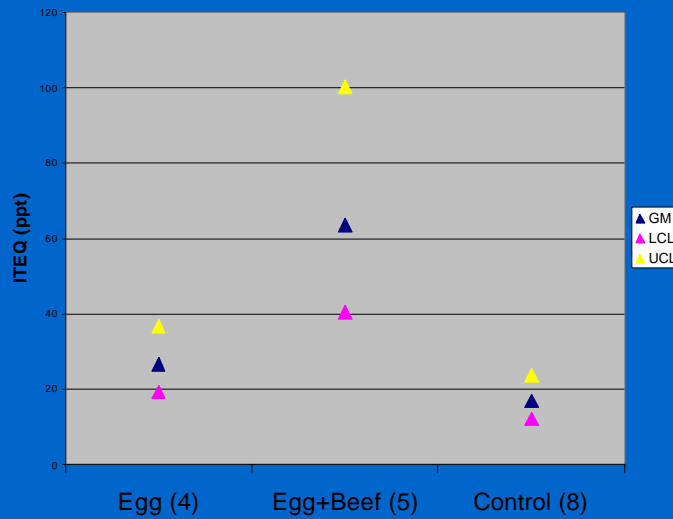
But, from the same study I have calculated the highest dosage of dioxins in terms of picograms per kilogram of body weight. The advice is to breast-feed; this is not considered a contraindication to breast-feeding. Unfortunately, the level in a woman's breast milk is very likely to correlate with levels that were in her body prenatally and, therefore, with transplacental transfer, to the infant.

## Oroville Dioxins in Eggs



Here in California the Department of Health Services has done very interesting investigations of dioxins in Oroville, among people living near a hazardous waste site called the Koppers facility, and also in Rosemond where there were a number of incinerators. DHS found higher exposures among people who were eating backyard-grown food in contaminated areas. This is probably true worldwide. So it's not just an issue about children, it's also an issue about environmental justice and people who are lower-income and live in contaminated areas. It is children in such communities who are probably at most risk.

## Oroville Dioxin Exposures



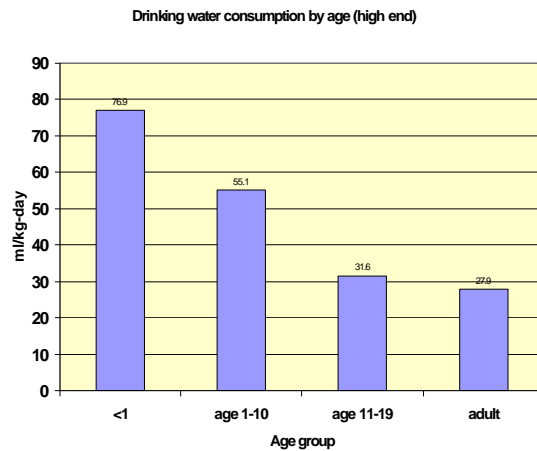
This slide, from the Oroville study area, shows that the blood levels of dioxins among those who are eating the backyard produce were about twice as high for exposed than among the controls.

## Intake Rates: Adults vs Children

- Drinking water
- Food
- Soil
- Air

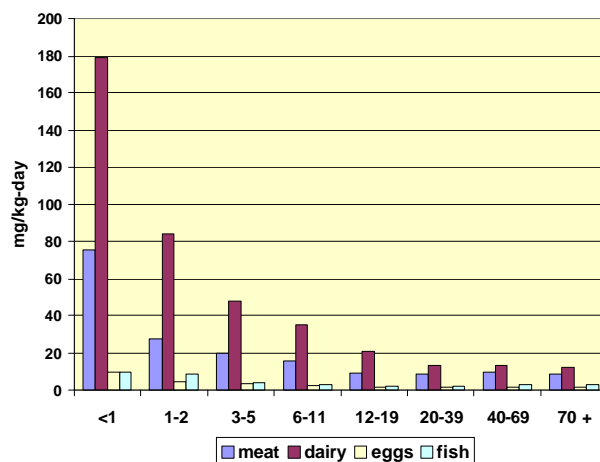
Intake levels for children and adults are different. The toxicologists in the room surely are aware of this, and this all comes from the EPA Exposure Factors Handbook.

# Drinking Water



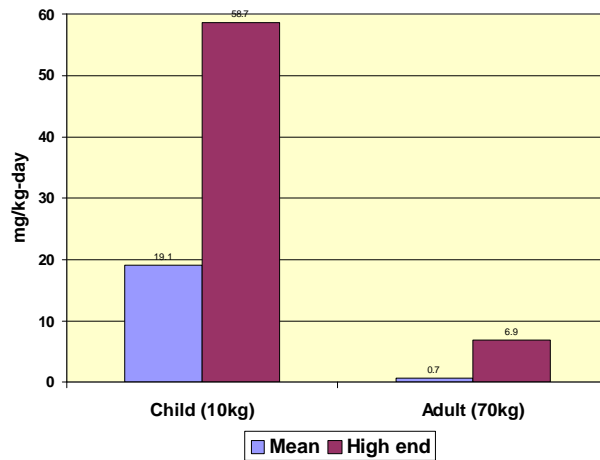
At a high end of drinking water consumption children under the age of one who are formula-fed with water in formula have the highest drinking water exposures per kilo of body weight.

# Food



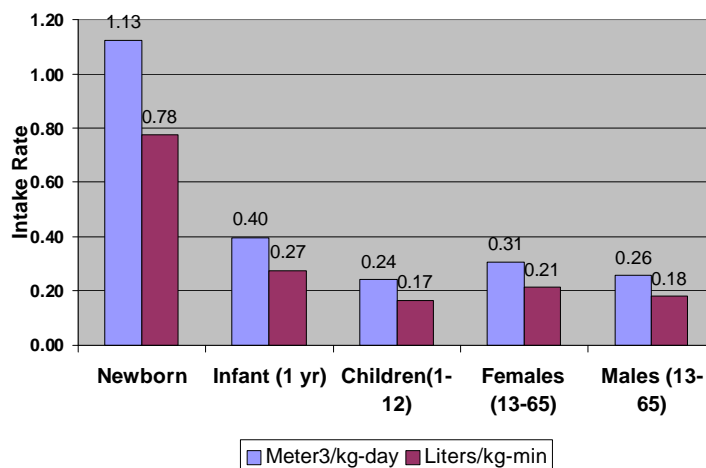
Children have relatively greater intake of certain foods as well. This slide shows intakes for meat, dairy, eggs and fish. Again, the infants less than one year of age have the highest exposures per kilo of body weight. Then those gradually go down to those in adult age groups.

## Soil



For soil consumption, obviously there's a much higher exposure to children per kilo of body weight. The blue bar is for the average consumption of soil and the red bar is for the "high end." This is not the pica individual but a high-end individual; a pica individual would be completely off of the curve.

## Air



For air exposures, the major issue is that newborns and infants have more exposure to air (and pollutants in air) per body weight than older children and adults.



## Policies to address risks to children

All of this has evolved into, on the federal level, a number of policies to address risks to children. I was very involved with the evolution of these while I was at the Environmental Protection Agency, and I think it was one of the more exciting things that I got to participate in.



## Precautionary principle

- **As governments agreed in 1992: “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”**

The precautionary principle is one thing that has been thrown out as "well, this is how we're going to protect children, is simply by using precaution." As adopted by governments the precautionary principle says that “lack a full scientific certainty shall not

be used as a reason for postponing cost-effective measures to prevent environmental degradation. The principle will be widely applied where there are threats of serious or irreversible damage.”

I believe that the whole effort to protect children's health is very consistent with application of the precautionary principle. But what is really important to do as scientists is to narrow the range of uncertainty. Children's health protection efforts are to increase the amount of scientific certainty for decision-making so that rather than having to invoke a rather vague principle, we can actually nail down what the risks are for children and be certain that we are protecting them.

But in the absence of that information, then do fall back on precaution. Although we don't talk about it a lot in the U.S., where we have uncertainty we often take a precautionary approach, and especially where there may be serious or irreversible consequences. This is certainly true when you're talking about neurological development of a child.

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## Legislation

- Example: Food Quality Protection Act


One example of a policy change that's resulted from the effort to address children's rights is the Food Quality Protection Act.





## Pesticides

- A pesticide is a chemical or biological agent used to control (or cause death to) a non-human organism considered by humans to be a “pest” -- that is, inimical to human interest. Thus, the term pesticide encompasses insecticides, fungicides, herbicides, rodenticides, antimicrobial disinfectants, and biocides.




This is the federal law governing the regulation of pesticides. A pesticide is basically anything that is labeled by a manufacturer as being effective in killing or inhibiting a pest. When I was at the EPA I learned that all kinds of things were pesticides that I never would have dreamed of, ranging from bear repellent to the sterilants that are used in operating rooms



## Pesticide Use

- In 1995, there were 876 pesticide “actives” of which 489 were used on foods; these are formulated into thousands of products registered for use on food in the U.S.
- In 1995, about 4 billion pounds of pesticides were used in the U.S.; 1.2 billion lbs of “conventional” pesticides.



In 1995 in the United States we had 876 active ingredients that were used commercially as pesticides; 489 of those used on foods; the others had numerous other uses. In 1995, a total of four billion pounds of pesticides were used, of which 1.2 billion were used in conventional agriculture.



## Pesticides in the Diets of Infants and Children

- 1993 Report from National Academy of Sciences National Research Council
- Concluded that the EPA inadequately assessed hazards and exposures to children
- Led to the enactment of the Food Quality Protection Act of 1996

And in 1993 the National Academy of Sciences issued a report, "Pesticides in the Diets of Infants and Children," that concluded that when it came to pesticides EPA was not adequately assessing either the exposures or the hazards for children. I think if they had taken a broader view they would have reached the same conclusion for air contaminants, for drinking water, and for other program areas at EPA. This report is what led to the enactment of the Food Quality Protection Act in 1996.

## Cumulative and Aggregate Risk :

- Aggregate Risk: The same pesticide with multiple exposure pathways (e.g., present in food, drinking water, and/or household products)
- Cumulative Risk: Multiple pesticides that act via a similar mechanism (e.g., OP's, triazines, organochlorines)

The Act has a couple of requirements that are a major departure from the practices in the past. One is that we will look at “aggregate risk.” That is, that risks of exposures through drinking water, food, and residential use will be aggregated rather than individually approving a full measure of risk for each pathway of exposure as had been allowed in the past. The second was that “cumulative risks” would be taken into account. This is that pesticides that might share a common mode of action would be in some way summed up in doing the risk assessment.

Both of these are ways of reducing uncertainty -- of using science in order to do a more accurate risk assessment. It's not scientifically valid to take compounds that have a common mode of action and assess them separately or to ignore aggregate risks from multiple routes of exposure.

## FQPA 10x Kids Factor

- EPA is required to apply a 10X FQPA safety factor (in addition to the traditional 10X uncertainty factors for interspecies and intraspecies extrapolation) unless there are sufficient toxicity and exposure data to ensure that children will be safe

The other new aspect of the Food Quality Protection Act is what I call the “10-X FQPA safety factor.” It is a requirement in the statute that, in addition to the usual tenfold uncertainty factors for interspecies and intraspecies extrapolation, a third factor would be applied to protect children “unless there are sufficient toxicity and exposure data to ensure that children will be safe.” Now, how EPA implements this provision is a matter of great concern, but, in a sense, this does reflect the precautionary principle, even though those words are not used. If you have the information you apply it, but where you don't have sufficient toxicity and exposure data to ensure that children will be safe the additional tenfold factor is to be applied.

## Executive Order - EO 13045

- In April 1997 President Clinton signed an Executive Order that requires federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and ensure that its policies, programs, activities and standards address disproportionate risk to children.

The other significant federal regulatory policy change was that the president issued an Executive Order on Children's Health and Safety. Having been involved in the process, I will tell you that it was a very well thought out policy. It was very difficult to achieve because there was much debate within the government about whether or not to do this. It's been said that when there's a new idea that the first response that people have is that this isn't really new, we do it anyway. The second response is this is much too difficult, we can't possibly achieve it. That was definitely what happened with this executive order, yet, at the end of the day, it has been remarkably successful.

## EO 13045

- Set as a high priority the identification and assessment of environmental health risks and safety risks that may disproportionately affect children
- Ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks
- Establish multi- agency Task Force, report to President

In the initial stages the major objection to it was we don't need an executive order to do this. The argument was that the government is already protecting children, we already do all of this. And then when crunch time came and the President was close to signing it, a number of the agencies came forward and said "we don't have enough resources to do this, it's too much work." The truth is that across the government children were not being considered in terms of their risks, and particularly the risks that disproportionately affect them. I think you have seen changes since this order came out. Not only at the EPA but also at the FDA where now there are policies regarding review of prescription drugs for children that were not in place before that. I think you've even seen changes in places like the National Highway and Transportation Safety Authority, in terms of safety devices for cars.

The Executive Order also established a multi-agency task force that is chaired by Carol Browner and Donna Shalala. That may sound from outside of the federal government like something that "is just political," but actually I think -- as you'll hear from, I think, Dr. Firestone later -- it is accomplishing amazing things. It is bringing high-level attention to

children's health issues and making things move that would have never moved without that.

## Rates of Disease and Impacts

- Developmental disabilities
- Birth defects and related conditions (low birthweight/prematurity)
- Asthma

I'm going to talk a little bit about the actual rates of some of the health problems in children and try to get back to the public health aspects of children's health protections.

## Developmental disabilities

- DDs are a group of physical, cognitive, psychological, sensory and speech impairments arising during development from up to 18 years of age.
- In the great majority of cases, the cause is unknown.
- Some 17% of all U.S. children under 18 years of age have a developmental disability. (CDC)

First, I am focusing on developmental disabilities, because many of the environmental toxicants that affect children do affect children's mental development, neurological development. However, I think it's important to say that none of these disabilities have



been shown to be related to environmental exposures. In fact, the epidemiology tends to look at functional measurements of children's neurological well being on a continuum. So in epidemiological studies we'll see things like shifts in I.Q. points or shifts in subtle behavioral end points, whereas, clinical studies look at break points, you either have the disability or you don't have it. You are mentally retarded or you have normal I.Q, and so understand that this is a major shift. But, I think it's important because we really don't understand what causes most disabilities.

Seventeen percent of all U.S. children have a major developmental disability, according to the Centers for Disease Control and Prevention



## Developmental disabilities

- About 2% of school children had a serious DD such as mental retardation or cerebral palsy.
- Known causes of mental retardation:
  - genetic factors (e.g., trisomy 21);
  - prenatal exposures (e.g., fetal alcohol syndrome);
  - infections (e.g., bacterial meningitis in infancy).

Two percent have a developmental disability that's considered to be very serious, such as mental retardation or cerebral palsy, disabilities that require quite a bit of intervention in terms of education or medical care. There are many known causes of mental retardation. These include genetic factors, prenatal syndromes and infections. But most children with mental retardation there is not a known cause.

## Developmental disabilities: Impacts

- In 1996, 12% of U.S. school children received special education services for one or more DDs.
- Attention Deficit Hyperactivity Disorder (ADHD) affects at least 3-5% of school children.
- ADHD is an inability to focus on tasks as well as impulsive hyperactive behavior or lethargic inattention. Children with ADHD have trouble with learning and social interactions.
- Later, ADHD is strongly associated with criminal behavior, substance abuse and risk taking.

Twelve percent of U.S. school children need special education services for

developmental disabilities. A number of these have attention deficit and hyperactivity

syndrome; 3 to 5% of children nationally are estimated to have ADHD, and in some

communities there are higher proportions reported. Some of you may have seen the

recent report out from the National Institutes of Health about the very high numbers of

children in this country who are on methylphenidate or Ritalin, which is a drug to treat

this disorder. It is not certain whether that is all due to children who would be diagnosed

versus the prescribing patterns, but I think we certainly all do agree that there are a lot of

children with ADHD. We don't know whether the rates are going up or not, and we don't

really understand what is causing the ADHD in most of these children.



## Autism

- Affects an estimated 285,000 children in the U.S., of all races and classes
- Because once thought to be a rare disease, autism has received little study
- Gene/environment interactions are probably key

Autism is another disease of children, a developmental disorder that has received a lot of focus recently. The CDC estimates that there are 285,000 children in the U.S. with autism. Once it was thought to be a rare disease; now a broader spectrum is identified as autism. Once it was thought to be only a disease of upper-income families. But now it's recognized to occur across all races and classes. Genetics play a role as well as the environment in autism.




## Healthy From The Start

### Why America Needs a Better System to Track and Understand Birth Defects and the Environment

A Pew Environmental Health Commission Report



### Goals: Focus on Environment

- Examine environmental associations with birth defects and related conditions
  - Analyze rates and time trends of infant mortality, low birthweight, preterm birth, and birth defects using NCHS and state birth defects registry data
  - Examine the quality of surveillance systems currently in place in the United States
- 

At the Pew Environmental Health Commission I was involved with writing a report on birth defects, low birth weight and related conditions.



## Definitions

- Low birthweight
  - a newborn weighing less than 2500 grams
  - very low birthweight is less than 1500 grams
- Preterm birth
  - born prior to 37 weeks gestation

We looked at the environmental associations, the trends, and the quality of the surveillance in the country.



## Definitions (cont.)

- Major structural birth defects
  - birth defects covered by CDC in its Metropolitan Atlanta Birth Defects Program, which result in the most serious medical consequences
  - includes neural tube defects, cardiac defects, and defects of the digestive and genitourinary tracts, among others

We looked first at the amount of knowledge that we have about the chemicals that are in commerce. There are 2863 chemicals that EPA has identified as being high-production-volume chemicals. That is at least a million pounds a year are produced in the U.S.

## Toxic Chemicals in the Environment 1

- Of the 2863 high production volume chemicals (HPVs; > one million pounds per year), 78.2% had no toxicity information at all.
- Of the 716 HPVs present in consumer products, nearly half (45.8%) lack screening developmental toxicity information.

Of these about 78% have no toxicity information at all. Even fewer have information about developmental toxicity. Of the 716 HPDs in consumer products, 45% of those don't have developmental toxicity information at all. We don't know about the developmental toxicity of almost half of the chemicals in consumer products.

## Toxic Chemicals in the Environment 2

- In 1997, there were a total of 2.58 billion pounds of TRI-reported industrial chemical releases and transfers
- At least 990 million pounds of these chemicals are “recognized” or “suspected” developmental toxicants

We looked at the TRI emissions, and in 1997 of the 2.58 billion pounds of TRI chemicals in the environment about a billion pounds were chemicals that had been either recognized or suspected (actually under your Prop 65 listing) as being developmental toxicants.

## Definitions (cont.)

- Major structural birth defects
  - birth defects covered by CDC in its Metropolitan Atlanta Birth Defects Program, which result in the most serious medical consequences
  - includes neural tube defects, cardiac defects, and defects of the digestive and genitourinary tracts, among others

## High-Use Pesticides and Developmental Toxicity

	Agricultural Use Ranking	Agricultural Usage (million lbs)	Household Use Ranking	Household Usage (million lbs)	Developmental Toxicity
Atrazine	1	68 - 73	—	—	—
Metolachlor	2	59 - 64	—	—	—
Metam Sodium	3	49 - 54	—	—	R
Methyl Bromide	4	39 - 46	—	—	R
Dichloropropene	5	38 - 43	—	—	—
2,4-D	6	31 - 36	1	7 - 9	S
Glyphosate	7	25 - 30	2	5 - 7	—
Cyanazine	8	24 - 29	—	—	R
Pendimethalin	9	23 - 28	—	—	—
Trifluralin	10	23 - 28	—	—	S
Acetochlor	11	22 - 27	—	—	—
Alachlor	12	19 - 24	—	—	S
EPTC	13	9 - 13	—	—	R
Chlorpyrifos	14	9 - 13	6	2 - 4	—
Chlorothalonil	15	8 - 12	—	—	—
Copper Hydroxide	16	7 - 11	—	—	—
Propanil	17	6 - 10	—	—	—
Dicamba	18	6 - 10	3	3 - 5	S
Terbufos	19	6 - 9	—	—	—
Mancozeb	20	6 - 9	—	—	S
Fluometuron	21	5 - 9	—	—	—
MSMA	22	4 - 8	—	—	—
Bentazone	23	4 - 8	—	—	—
Parathion	24	4 - 7	—	—	S
Sodium Chlorate	25	4 - 6	—	—	S
MCPP	—	—	4	3 - 5	—
Diazinon	—	—	—	2 - 4	—
Carbaryl	—	—	7	1 - 3	S
Benefin	—	—	8	1 - 3	—
Dacthal	—	—	9	1 - 3	—

SOURCE: EPA estimates based on proprietary data. EPA, 1997. See Appendix B for references for this list.

NOTE: List is limited to conventional pesticides. It does not include sulfur usage (79-89 million lbs. in 1995) and petroleum oil/distillates usage (50-57 mil. lbs. in 1995).

## Exposure Monitoring

- The only effort to monitor population exposures to chemicals is carried out by CDC as part of the National Health and Nutrition Examination Survey (NHANES)
- Only 31 potential developmental toxicants have ever been monitored through NHANES to describe the exposure in humans

We did a similar analysis for pesticides. Of the major pesticides that are reported to be in use, about half of them are recognized or suspected developmental toxicants. We found that the CDC does very little monitoring for developmental toxicants.

## Definitions (cont.)

- Major structural birth defects
  - birth defects covered by CDC in its Metropolitan Atlanta Birth Defects Program, which result in the most serious medical consequences
  - includes neural tube defects, cardiac defects, and defects of the digestive and genitourinary tracts, among others

Birth defects are the number one cause of infant mortality and extremely expensive, \$8 billion a year in annual health care costs.



## Birth Defects

- An estimated 400 children are born with and 21 die from serious structural birth defects each day
- Birth defects are the leading cause of infant mortality, responsible for more than 1 in 5 infant deaths
- They account for nearly \$8 billion in annual health care costs and other expenditures

## Developmental Disabilities

- Mostly prenatal in onset
- Severe Developmental Disabilities
  - Cerebral Palsy
  - Autism
  - Mental Retardation

Low birth weight rates in this country are not going down, if anything they're going up a bit.

## Trends: Low Birthweight

- Since the 1980s, rates of low birthweight (LBW) and preterm birth have been increasing steadily in the US
- Among singleton births, LBW has increased 4% and very low birthweight (VLBW) 7% since 1989
- Among 20-34 year old mothers of singleton births, LBW increased 2.2% and VLBW 5.9% from 1990-97

NCHS data

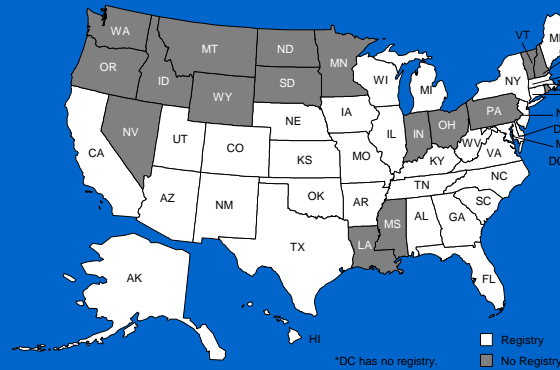
Even among singleton births to mothers between 20 and 34 we saw an upward trend in low birth weight and very low birth weight babies, between '90 and '97. Likewise, rates of pre-term birth are not going down in this country.

## Trends: Preterm Birth

- Among singleton births, rates of moderately preterm births (32-36 weeks) have increased 14% since 1989
- CDC reported that after taking into account a number of risk factors (age of mother, prenatal care, marital status) there was a 4.6% increase in preterm birth in white non-Hispanic infants between 1989-96

Even looking at singleton births (you have to weed out the multiple births with all the use of fertility drugs in this country today), you see an increase in pre-term births between '89 and '96.

## States with Birth Defects Registries



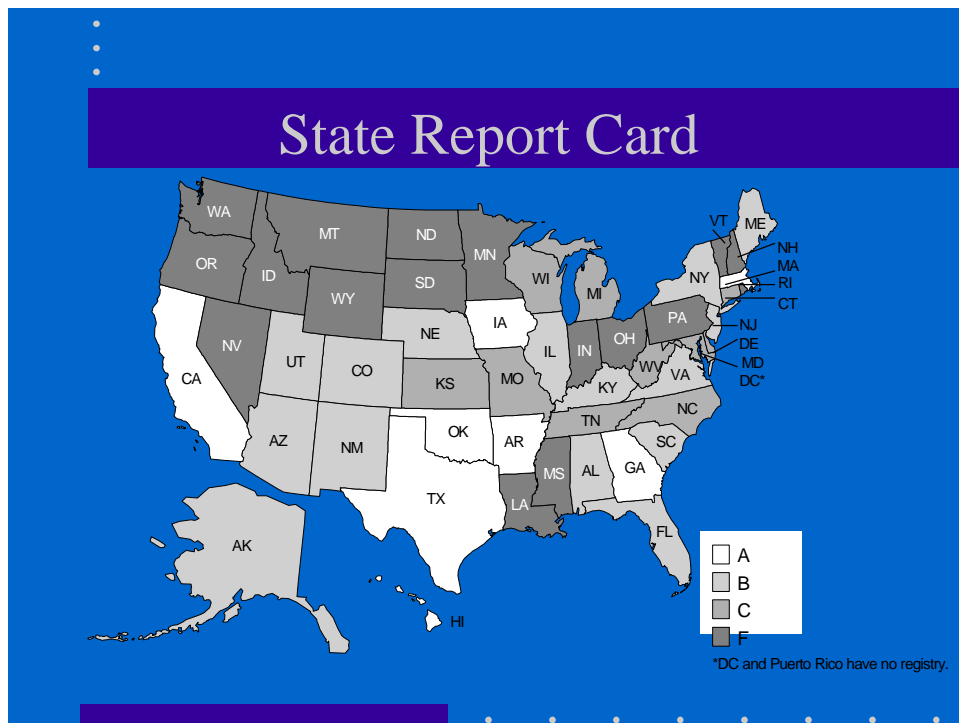
A number of states had birth defects registries and we looked at how well they are doing the surveillance for those.

## State Grading Criteria

- Grade A: Top states with programs that incorporate most, if not all, of the key components (8 states)
- Grade B-C: States with some of the components in place, but have particular shortcomings (25 states)
- Grade F: States with no program currently in place (17 states plus the District of Columbia and Puerto Rico)

We graded them. Basically we identified some key components that a registry should have, and that if they didn't have it they either got a B or C grade, or if they had no program at all they received an F.

This is a report card that we created, rating state efforts in birth defects surveillance. A number of the states who received low grades have already, since November, put through legislation to set up birth defects monitoring programs.





## Next Commission Report: Asthma

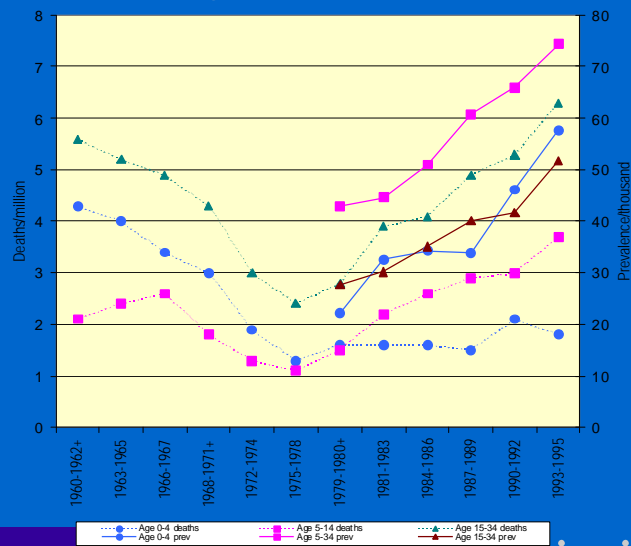
Our next report is going to be on asthma, and is scheduled for release on May 16th. We will focus on the rising asthma prevalence and mortality rates. There's a focus on children and young people, but we're looking at trends across the entire population.



## Asthma rates are rising in the US

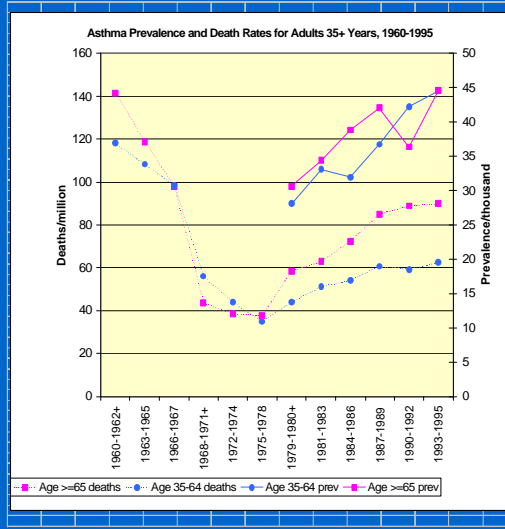
- Rising rates across the board:
  - prevalence
  - mortality
- Focus on children and young people (less than 35 years of age)

## Asthma Prevalence and Mortality in Children and Young Adults: 1960-95



The lines that you see here that are dashed lines are the asthma mortality curves from 1960 to 1995. This is a very unusual picture, a U-shaped curve for mortality in this country. In other words, rates of death were going down until about 1977, and then they started climbing up again. The solid lines are for prevalence, and there is a very nice synchronicity between prevalence and mortality, and I think a good case to be made that the reason that the mortality has risen since 1977 is that the prevalence has risen. It is very surprising to see this because the asthma medications are so much better today than they used to be. Certainly when I trained in pediatrics the medications themselves produced greater hazards, especially for young children and the elderly. Today the medications are generally safer and more effective.

## Asthma Prevalence and Mortality in Older Adults: 1960-94



This is the same set of curves for the elderly. The same picture of using prevalence and mortality rates is apparent.

## Asthma prevalence in 2000

- At least 17 million in the U.S. with asthma today
- ~50% of those with asthma would not have asthma if rates were at 1980 levels
- ~15% of asthma among the poor is due to poverty; this has been constant for 20 years
- poverty explains most race, urban/rural differences

Today there are at least 17 million people in the country with asthma. Half of the asthma we have today wouldn't exist if we had the rates we had 20 years ago.

The other thing that's interesting is that among the poor about 15% of their asthma is due to poverty, at least statistically, and that this has been a constant over the last 20 years.

So whatever are the factors that account for more asthma among the poor, they've been

present for the last couple of decades. We have done nothing to affect those factors, to reduce the disparities in asthma rates. Poverty explains most of the race and urban-world differences that are observed. While asthma rates are highest in the inner city and among minorities, our analysis would indicate that it's poverty that's the issue. Because if you're poor and you're in the country you have the same rates of asthma as if you're poor and you're in the city.

The slide features a blue background with a purple title bar at the top. The title 'Asthma and poverty' is written in white serif font. Below the title, a bulleted list of risk factors is displayed in white sans-serif font. The list includes: 'Poverty is associated with a number of risk factors for asthma development and/or exacerbation', followed by five sub-points: 'Outdoor air pollution', 'Poor indoor air quality', 'Poor nutrition', 'Decreased breast feeding', and 'More and earlier respiratory infections'. The slide is decorated with small white dots in the top-left and bottom-right corners.

## Asthma and poverty

- Poverty is associated with a number of risk factors for asthma development and/or exacerbation
  - Outdoor air pollution
  - Poor indoor air quality
  - Poor nutrition
  - Decreased breast feeding
  - More and earlier respiratory infections

Some of the factors that have to do with poverty, and I think that these are clues really for all of us, they have certainly greater levels of outdoor air pollution, indoor air quality, poorer nutrition, decreased breast feeding, and more and earlier respiratory infections. All of these seem to be factors involved either with development or exacerbation of asthma.





## Asthma rates are exploding

- Increases are seen for all age groups, but especially among the very young
- Increases are parallel for rich and poor and all ethnic groups, suggesting a factor or factors across the population

So what we're going to say is that the asthma rates are exploding in the country, that the increases are there for all age groups, but especially the very young. They're for the rich and poor, nobody is being left out of this epidemic. There must be factors across the entire population that are involved with this.

Our report is going to talk about the core functions of public health, particularly the need for better surveillance, the need for development of policies, the need for what in public health we call assurance, the delivery of the protections and what you at Cal EPA basically do every day, which is delivering public health protection.

## PEHC Policy Areas

- Public Health Capacity
  - Core Functions:
    - Assessment and role of surveillance
    - Policy development
    - Assurance
- Leadership
  - Focus for responsibility and accountability

And the need for leadership, and particularly in this area of asthma. There is complete lack of anybody in the federal government responsible for this epidemic. There's nobody to point to, to hold accountable for bringing the rates of asthma down in the country.

In conclusion, it's a pleasure to be here with you all. This is a wonderful lineup of speakers that you have here today. I just can't believe whom you've been able to bring together. I especially want to thank Dr. Miller for talking me into coming to this, and also for his work with the American Academy of Pediatrics. I want to give credit to the pediatric academy for really bringing all of this together at the beginning. And particularly Dr. Robert Miller, who is retired now from the National Cancer Institute, was the founder of the Environmental Health Committee for the Academy. He is somebody who served as an inspiration for my career, is the grandfather for this entire effort, and I think deserves recognition for that.

Thank you very much. (Applause.)